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PRELIMINARY REPORT
INDUSTRY SERIES

1987
Census of
Manufactures

MC87-I-33B(P)
Issued May 1989

FERROUS AND NONFERROUS FOUNDRIES

Industries 3321, 3322, 3324, 3325, 3363, 3364, 3365, 3366, and 3369

INTRODUCTION

This report presents preliminary statistics from the 1987 Census of Manufactures for those establishments classified in the industries listed above. These data will be superseded by a more comprehensive final paperbound report. The method of data collection and use of administrative data are discussed in detail in the appendix.

All dollar figures included in this report are at prices current for the year specified and, therefore, unadjusted for changes in price levels. Consequently, when making comparisons to prior years, users should take into consideration the inflation that has occurred.

The definitions of these industries are the same as those used in the 1987 Standard Industrial Classification (SIC) Manual.¹

INDUSTRY 3321, GRAY AND DUCTILE IRON FOUNDRIES

In the 1987 Census of Manufactures, Industry 3321, Gray and Ductile Iron Foundries, had employment of 81.9 thousand. The employment figure was 16 percent below the 97.3 thousand reported in 1982.

The total value of shipments for establishments classified in this industry was \$7.2 billion.

The cost of materials and services used by establishments in this industry amounted to \$3.2 billion in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3322, MALLEABLE IRON FOUNDRIES

In the 1987 Census of Manufactures, Industry 3322, Malleable Iron Foundries, had employment of 4.2 thousand. The employment figure was 35 percent below the 6.5 thousand reported in 1982. Compared with 1986, employment in 1987 decreased 30 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was \$283.4 million.

The cost of materials and services used by establishments in this industry amounted to \$101.0 million in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3324, STEEL INVESTMENT FOUNDRIES

In the 1987 Census of Manufactures, Industry 3321, Steel Investment Foundries, had employment of 20.3 thousand. The employment figure was 21 percent above the 16.8 thousand reported in 1982. Compared with 1986, employment in 1987 increased 9 percent. The 1986 data are based on the Bureau's annual survey of manufactures (ASM), which is a sample survey conducted each year between censuses.

The total value of shipments for establishments classified in this industry was \$1.5 billion.

The cost of materials and services used by establishments in this industry amounted to \$498.1 million in 1987. Data on specific materials consumed appear in table 3.

¹Standard Industrial Classification Manual: 1987. For sale by Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. Stock No. 041-001-00314-2.

Address inquiries to Bureau of the Census, Industry Division, Washington, DC 20233, or call Jessica Young (301) 763-7304.



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INDUSTRY 3325, STEEL FOUNDRIES, N.E.C.

In the 1987 Census of Manufactures, Industry 3325, Steel Foundries, N.E.C., had employment of 23.0 thousand. The employment figure was 38 percent below the 36.9 thousand reported in 1982.

The total value of shipments for establishments classified in this industry was \$1.7 billion.

The cost of materials and services used by establishments in this industry amounted to \$678.8 million in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3363, ALUMINUM DIE-CASTINGS

In the 1987 Census of Manufactures, Industry 3363, Aluminum Die-Castings, had employment of 27.8 thousand.

The total value of shipments for establishments classified in this industry was \$2.5 billion.

The cost of materials and services used by establishments in this industry amounted to \$1.2 billion in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3364, NONFERROUS DIE-CASTINGS, EXCEPT ALUMINUM

In the 1987 Census of Manufactures, Industry 3364, Nonferrous Die-Castings, Except Aluminum, had employment of 12.8 thousand.

The total value of shipments for establishments classified in this industry was \$981.5 million.

The cost of materials and services used by establishments in this industry amounted to \$457.0 million in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3365, ALUMINUM FOUNDRIES

In the 1987 Census of Manufactures, Industry 3365, Aluminum Foundries, had employment of 25.9 thousand.

The total value of shipments for establishments classified in this industry was \$1.8 billion.

The cost of materials and services used by establishments in this industry amounted to \$821.4 million in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3366, COPPER FOUNDRIES

In the 1987 Census of Manufactures, Industry 3366, Copper Foundries, had employment of 8.3 thousand.

The total value of shipments for establishments classified in this industry was \$638.4 million.

The cost of materials and services used by establishments in this industry amounted to \$290.7 million in 1987. Data on specific materials consumed appear in table 3.

INDUSTRY 3369, NONFERROUS, N.E.C.

In the 1987 Census of Manufactures, Industry 3369, Nonferrous, N.E.C., had employment of 4.0 thousand.

The total value of shipments for establishments classified in this industry was \$331.9 million.

The cost of materials and services used by establishments in this industry amounted to \$122.7 million in 1987. Data on specific materials consumed appear in table 3.

ABBREVIATIONS AND SYMBOLS

The following abbreviations and symbols are used in the tables in this publication:

-	Represents zero.
(D)	Withheld to avoid disclosing data for individual companies; data are included in higher level totals.
(NA)	Not available.
(NC)	Not comparable.
(S)	Withheld because estimate did not meet publication standards on the basis of either the response rate or a consistency review.
(X)	Not applicable.
(Z)	Less than half the unit shown.
do	Ditto.
n.e.c.	Not elsewhere classified.
n.s.k.	Not specified by kind.
pt.	Part.
r	Revised.
SIC	Standard Industrial Classification.

Other abbreviations, such as lb, gal, yd, doz, bbl, and s tons, are used in the customary sense.

CONTACTS FOR DATA USERS

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Census/ASM		
Durables	Kenneth Hansen	(301) 763-7304
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Import/Export Publications	Foreign Trade Division	(301) 763-5140
Industry Analysis and Forecasts	International Trade Administration	(202) 377-4356

Table 1. Historical Statistics for the Industry: 1987 and Earlier Years

[Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendix]

Year¹	Companies² (no.)	All establishments³		All employees		Production workers			Value added by manufac- ture⁴ (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expend- itures (million dollars)	End-of- year inventories⁴ (million dollars)	Ratios	
		Total (no.)	With 20 employ- ees or more (no.)	Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Weges (million dollars)						Special- ization (per- cent)	Cover- age (per- cent)
INDUSTRY 3321, GRAY AND DUCTILE IRON FOUNDRIES															
1987 Census	(NA)	748	488	81.9	2 279.7	67.5	139.4	1 769.0	4 011.7	3 187.5	7 168.7	357.0	689.0	(NA)	(NA)
1986 ASM	(NA)	(NA)	(NA)	81.1	2 180.4	65.9	132.2	1 682.5	3 769.0	3 119.7	6 919.1	393.2	645.2	(NA)	(NA)
1985 ASM	(NA)	(NA)	(NA)	88.6	2 312.9	72.5	146.1	1 789.9	3 989.7	3 285.8	7 295.7	329.8	695.6	(NA)	(NA)
1984 ASM	(NA)	(NA)	(NA)	98.4	2 429.0	81.1	162.4	1 898.0	4 432.2	3 522.6	7 959.6	273.9	743.2	(NA)	(NA)
1983 ASM	(NA)	(NA)	(NA)	91.8	2 072.2	74.8	143.5	1 573.9	3 465.9	3 006.9	6 498.3	223.1	748.9	(NA)	(NA)
1982 Census	801	925	635	97.3	1 965.0	78.2	139.8	1 463.0	3 310.5	2 840.4	6 202.2	338.0	750.0	94	91
1981 ASM	(NA)	(NA)	(NA)	128.5	2 581.6	105.5	202.2	1 973.1	4 166.1	4 330.6	8 471.7	741.2	857.1	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	131.0	2 410.1	106.6	203.6	1 835.6	4 211.6	3 612.2	7 825.3	653.5	778.4	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	152.1	2 677.9	126.9	249.9	2 107.7	4 708.3	4 333.8	8 979.1	626.7	796.9	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	149.2	2 531.6	125.8	252.4	2 023.7	4 597.3	4 045.3	8 658.4	610.8	686.8	(NA)	(NA)
1977 Census	865	984	683	138.8	2 146.0	116.8	236.1	1 703.2	4 070.7	3 355.5	7 388.7	503.1	654.4	96	88
1976 ASM	(NA)	(NA)	(NA)	136.0	1 945.4	114.5	229.7	1 534.4	3 522.7	3 122.8	6 597.4	394.7	611.6	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	138.0	1 723.1	116.5	227.4	1 356.9	3 101.6	2 767.8	5 829.4	366.9	576.0	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	151.8	1 795.6	130.0	264.5	1 443.9	3 035.4	2 783.6	5 786.7	439.7	594.8	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	152.4	1 695.9	130.7	272.3	1 379.2	2 750.0	2 029.4	4 790.8	226.4	399.4	(NA)	(NA)
1972 Census	892	993	723	138.4	1 387.4	118.1	245.7	1 119.7	2 257.0	1 639.4	3 876.5	202.5	351.8	94	87
INDUSTRY 3322, MALLEABLE IRON FOUNDRIES															
1987 Census	(NA)	28	19	4.2	121.4	3.0	5.9	77.4	183.1	101.0	283.4	3.7	22.4	(NA)	(NA)
1986 ASM	(NA)	(NA)	(NA)	6.0	156.6	4.2	8.0	98.0	221.3	172.2	396.7	15.6	29.0	(NA)	(NA)
1985 ASM	(NA)	(NA)	(NA)	6.3	159.8	4.5	8.5	102.8	264.6	168.2	432.9	16.9	34.6	(NA)	(NA)
1984 ASM	(NA)	(NA)	(NA)	6.0	157.5	4.7	9.2	103.7	270.1	165.4	431.9	22.1	35.4	(NA)	(NA)
1983 ASM	(NA)	(NA)	(NA)	5.4	125.2	4.0	7.1	78.6	213.3	111.9	324.0	6.6	25.2	(NA)	(NA)
1982 Census	46	50	31	6.5	135.7	4.8	8.2	89.3	206.3	112.9	323.2	11.9	25.3	89	77
1981 ASM	(NA)	(NA)	(NA)	9.3	190.2	7.2	13.9	134.9	307.8	177.7	479.0	28.1	35.6	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	11.7	209.9	8.7	16.4	144.1	306.6	211.9	521.2	20.5	43.9	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	15.3	271.2	11.7	22.5	195.0	436.4	293.5	727.6	36.3	49.6	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	17.1	287.2	13.7	26.7	210.0	481.9	284.1	764.8	43.2	46.1	(NA)	(NA)
1977 Census	58	66	53	18.2	273.0	14.6	27.9	202.5	458.8	265.7	721.9	28.9	43.6	86	93
1976 ASM	(NA)	(NA)	(NA)	17.6	251.4	14.0	26.6	181.9	435.5	258.7	691.0	28.2	41.8	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	17.8	222.4	14.3	26.9	160.1	358.3	232.9	591.8	40.5	43.3	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	21.2	242.0	17.7	34.3	190.4	380.9	276.1	654.7	29.2	46.6	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	23.2	258.0	19.5	39.6	204.2	365.0	211.8	572.3	24.9	39.3	(NA)	(NA)
1972 Census	64	73	64	22.5	234.5	18.7	38.1	184.3	342.6	167.1	507.9	34.9	33.2	87	91
INDUSTRY 3324, STEEL INVESTMENT FOUNDRIES															
1987 Census	(NA)	135	95	20.3	470.6	15.6	31.1	320.6	990.2	498.1	1 454.5	36.5	255.7	(NA)	(NA)
1986 ASM	(NA)	(NA)	(NA)	18.6	418.5	13.9	27.7	276.2	884.6	489.3	1 359.3	45.2	230.0	(NA)	(NA)
1985 ASM	(NA)	(NA)	(NA)	18.5	394.9	14.1	29.4	271.0	798.5	477.4	1 262.9	51.4	218.4	(NA)	(NA)
1984 ASM	(NA)	(NA)	(NA)	17.2	352.8	13.4	26.9	235.3	727.7	421.2	1 124.5	25.0	201.7	(NA)	(NA)
1983 ASM	(NA)	(NA)	(NA)	15.2	291.9	11.3	22.2	190.9	589.0	354.9	939.6	21.5	165.5	(NA)	(NA)
1982 Census	117	132	108	16.8	299.4	12.6	24.4	197.2	635.7	363.3	1 024.6	32.9	162.6	91	96
1981 ASM	(NA)	(NA)	(NA)	15.8	257.8	11.9	24.1	171.8	588.0	340.3	912.7	20.3	164.1	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	16.2	251.2	12.6	26.2	168.6	553.5	352.3	898.5	33.9	154.1	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	15.1	213.8	11.9	24.7	150.9	466.5	287.4	728.6	25.4	137.7	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	12.0	152.0	9.5	19.4	109.2	325.3	177.6	487.3	10.1	89.2	(NA)	(NA)
1977 Census	80	92	68	10.5	128.7	8.1	16.5	85.9	267.4	144.8	407.5	10.9	65.6	93	86
1976 ASM	(NA)	(NA)	(NA)	9.9	117.3	7.7	15.4	79.6	251.3	146.6	395.2	13.2	58.6	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	10.4	112.8	8.3	16.5	79.6	240.0	135.1	376.5	22.3	53.7	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	13.9	137.8	11.4	23.0	96.6	279.3	144.9	408.0	11.7	69.4	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	11.6	102.5	9.2	18.4	71.1	194.2	100.3	284.5	7.0	42.2	(NA)	(NA)
1972 Census	68	74	62	11.2	93.2	8.6	17.2	63.3	175.6	89.4	262.2	11.1	38.1	86	94
INDUSTRY 3325, STEEL FOUNDRIES, N.E.C.															
1987 Census	(NA)	293	177	23.0	545.2	17.9	35.5	377.8	1 020.6	678.8	1 688.0	38.1	270.5	(NA)	(NA)
1986 ASM	(NA)	(NA)	(NA)	19.7	457.3	15.3	29.4	315.5	774.8	629.9	1 424.5	543.4	216.2	(NA)	(NA)
1985 ASM	(NA)	(NA)	(NA)	22.8	507.9	17.8	34.6	365.0	920.3	680.8	1 618.2	48.0	250.2	(NA)	(NA)
1984 ASM	(NA)	(NA)	(NA)	25.0	575.5	19.7	38.9	416.5	1 067.2	748.6	1 799.4	61.1	293.8	(NA)	(NA)
1983 ASM	(NA)	(NA)	(NA)	25.4	540.8	19.0	35.1	374.8	815.5	676.1	1 518.4	45.3	287.6	(NA)	(NA)
1982 Census	290	331	228	36.9	713.0	28.4	49.6	498.8	1 209.0	826.3	2 091.4	99.6	313.2	90	92
1981 ASM	(NA)	(NA)	(NA)	53.9	1 000.8	43.5	82.4	753.5	1 839.2	1 240.9	3 084.0	133.6	360.6	(NA)	(NA)
1980 ASM	(NA)	(NA)	(NA)	60.8	1 071.5	49.6	93.8	822.2	2 040.1	1 376.8	3 392.1	168.5	433.6	(NA)	(NA)
1979 ASM	(NA)	(NA)	(NA)	61.7	1 027.7	51.3	101.8	807.7	1 998.4	1 226.4	3 222.0	146.4	394.4	(NA)	(NA)
1978 ASM	(NA)	(NA)	(NA)	57.3	878.7	46.7	91.4	666.9	1 608.6	997.1	2 592.2	112.7	357.5	(NA)	(NA)
1977 Census	287	323	229	54.8	781.5	44.2	87.3	591.0	1 439.8	882.3	2 312.1	115.9	341.3	87	91
1976 ASM	(NA)	(NA)	(NA)	52.8	681.4	42.8	83.4	513.9	1 287.0	832.7	2 103.4	207.1	322.5	(NA)	(NA)
1975 ASM	(NA)	(NA)	(NA)	54.7	654.9	45.0	89.9	506.6	1 276.0	823.7	2 073.7	90.0	277.0	(NA)	(NA)
1974 ASM	(NA)	(NA)	(NA)	52.5	574.7	43.7	86.2	449.2	1 028.6	708.1	1 685.8	63.5	250.4	(NA)	(NA)
1973 ASM	(NA)	(NA)	(NA)	49.1	494.7	40.6	81.7	387.1	757.0	442.2	1 210.1	38.7	144.4	(NA)	(NA)
1972 Census	225	260	201	46.7	440.2	38.5	75.5	337.4	706.0	368.4	1 067.4	31.5	152.1	89	88
INDUSTRY 3363, ALUMINUM DIE-CASTINGS⁶															
1987 Census	(NA)	405	228	27.8	691.8	22.5	46.1	512.7	1 256.7	1 215.0	2 456.2	94.2	181.3	(NA)	(NA)
INDUSTRY 3364, NONFERROUS DIE-CASTINGS, EXCEPT ALUMINUM⁶															
1987 Census	(NA)	294	155	12.8	256.4	10.3	20.5	173.9	529.6	457.0	981.5	26.2	100.2	(NA)	(NA)
INDUSTRY 3365, ALUMINUM FOUNDRIES⁶															
1987 Census	(NA)	571	249	25.9	557.8	21.3	42.5	411.4	1 004.5	821.4	1 821.6	51.8	162.1	(NA)	(NA)

See footnotes at end of table.

Table 1. Historical Statistics for the Industry: 1987 and Earlier Years—Con.

[Excludes data for auxiliaries. For meaning of abbreviations and symbols, see introductory text. For explanation of terms, see appendix.]

Year ¹	Com- panies ² (no.)	All establishments ³		All employees		Production workers			Value added by manufac- ture ⁴ (million dollars)	Cost of materials (million dollars)	Value of shipments (million dollars)	New capital expend- itures (million dollars)	End-of- year inventories ⁴ (million dollars)	Ratios	
		Total (no.)	With 20 employ- ees or more (no.)	Number (1,000)	Payroll (million dollars)	Number (1,000)	Hours (millions)	Wages (million dollars)						Spe- cial- ization (per- cent)	Cover- age (per- cent)
1987 Census ----	INDUSTRY 3366, COPPER FOUNDRIES ⁶														
	(NA)	334	123	8.3	177.3	6.6	12.9	125.9	349.8	290.7	638.4	14.0	59.1	(NA)	(NA)
	INDUSTRY 3369, NONFERROUS FOUNDRIES, N.E.C. ⁶														
1987 Census ----	(NA)	58	25	4.0	100.8	2.9	5.6	63.4	212.0	122.7	331.9	9.1	80.0	(NA)	(NA)

Note: Establishments of single unit companies with up to 20 employees (cutoff varied by industry) were excluded from the mail portion of the census. Data for these establishments (and a small number of larger establishments whose reports were not received at the time the data were tabulated) were estimated based on administrative-record information from other agencies in conjunction with industry averages. These establishments accounted for the following percent of total value of shipments: SIC 3321, 6%; SIC 3322, 5%; SIC 3324, 8%; SIC 3325, 15%; SIC 3363, 11%; SIC 3364, 19%; SIC 3365, 9%; SIC 3366, 29%, and SIC 3369, 8%.

¹In annual survey of manufactures (ASM) years, data are estimates based on a representative sample of establishments canvassed annually and may differ from results of a complete canvass of all establishments. ASM publication shows percentage standard errors. Unless otherwise noted, for data prior to 1972, see 1972 Census of Manufactures, vol. II, table 1a of the Industry chapter.

²For the census, a company is defined as a business organization consisting of one establishment or more under common ownership or control.

³Includes establishments with payroll at any time during year.

⁴Beginning with the 1982 Census of Manufactures, all respondents were requested to report their inventories at (the lower of) cost or market prior to adjustment to LIFO cost. This is a change from prior Censuses and annual surveys of manufactures in which respondents were permitted to value their inventories using any generally accepted accounting method. Consequently, inventories and value added by manufacture are not comparable to prior-year data.

⁵Estimates for new capital expenditures have associated standard error of 15 percent or more and may be of limited reliability. Estimates for other data items are of acceptable reliability.

⁶Industry definition is new for 1987 Census of Manufactures. An explanation of the Standard Industrial Classification revision will appear in the final industry series text that will supercede this report.

Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text.]

1987 product code	Product	1987			1982		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
3321--	GRAY AND DUCTILE IRON FOUNDRIES						
	Total	(NA)	(X)	6 813.2	(NA)	(X)	6 287.7
33211 --	Ductile iron pressure pipe and fittings	(NA)	(X)	952.8	(NA)	(X)	541.6
	Ductile iron castings:						
33211 21	Ductile iron pressure pipe:						
	Less than 14 in. (inside diameter)	8	1 080.2	523.0	11	(S)	3473.0
33211 23	14 in. or more (inside diameter)	5	572.3	286.6			
33211 25	Fittings:						
	Less than 14 in. (inside diameter)	15	69.1	103.0	16	42.1	464.3
33211 26	14 in. or more (inside diameter)	9	23.3	40.1			
33211 00	Ductile iron pressure pipe and fittings, n.s.k.	(NA)	(X)	-	(NA)	(X)	4.4
33212 --	Other ductile iron castings	(NA)	(X)	1 356.6	(NA)	(X)	1 113.7
33212 22	Automotive uses						
	..... 1,000 s	46	816.1	788.6	40	632.9	627.0
33212 24	Construction and utility uses	30	*21.1	24.2	37	*26.5	39.1
33212 31	Valve uses	28	20.8	45.3	32	*20.7	38.7
33212 32	Electric and electronic equipment uses	9	(S)	5.4	10	5.7	10.2
33212 33	Machinery uses	63	107.6	134.0	68	**84.3	122.8
33212 34	Heat resistant parts, including coke oven door parts	8	(S)	5.2	7	(S)	13.3
33212 39	All other uses	94	274.1	323.2	113	**183.2	252.6
33212 00	Other ductile iron castings, n.s.k.	(NA)	(X)	30.7	(NA)	(X)	9.9
33216 --	Molds and stools for heavy steel ingots:						
33216 00	Molds and stools for heavy steel ingots	11	725.7	235.2	(NA)	923.6	345.8
33217 --	Cast iron pressure pipe and fittings	(NA)	(X)	80.9	(NA)	(X)	190.5
	Gray iron castings (excluding ductile iron):						
33217 31	Cast iron pressure pipe:						
	Less than 14 in. (inside diameter)	3	(S)	2.9	11	(S)	549.6
33217 33	14 in. or more (inside diameter)						
	..... 1,000 s	10	36.1	45.1	31	*137.0	6135.4
33217 35	Fittings:	6	15.6	23.4			
33217 36	Less than 14 in. (inside diameter)						
33217 00	14 in. or more (inside diameter)						
	..... 1,000 s	(NA)	(X)	9.5	(NA)	(X)	5.5

See footnotes at end of table.

Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text.]

1987 product code	Product	1987			1982		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
3321- --	GRAY AND DUCTILE IRON FOUNDRIES—Con.						
33218 --	Cast iron soil pipe and fittings, including special fittings -----	(NA)	(X)	184.9	(NA)	(X)	181.6
33218 22	Cast iron soil pipe: 3 in. or less (inside diameter) ----- 1,000 s tons..	6	85.5	43.6	8	*109.5	50.3
33218 24	More than 3 in. up to but not including 5 in. (inside diameter) ----- do..	5	113.2	53.2	9	*79.0	30.8
33218 27	5 in. or more (inside diameter) ----- do..	5	58.5	29.7	7	101.6	35.9
33218 30	Fittings, including special fittings: 3 in. or less (inside diameter) ----- 1,000 s tons..	6	**20.6	18.3	9	40.3	31.1
33218 33	More than 3 in. up to but not including 5 in. (inside diameter) ----- do..	7	31.0	27.4	10	24.8	17.8
33218 36	5 in. or more (inside diameter) ----- do..	6	*12.9	12.7	9	*15.7	13.2
33218 00	Cast iron soil pipe and fittings, including special fittings, n.s.k. -----	(NA)	(X)	-	(NA)	(X)	2.4
33219 --	Other gray iron castings -----	(NA)	(X)	3 585.0	(NA)	(X)	3 707.9
33219 31	Rolls for rolling mills ----- 1,000 s tons..	9	42.0	57.5	17	(S)	153.2
33219 39	Automotive uses ----- do..	56	2 373.1	1 900.4	69	1 770.7	1 497.3
33219 49	Construction and utility uses ----- do..	64	**410.9	376.3	95	(S)	464.4
33219 98	All other uses ----- do..	250	*1 537.1	1 137.4	410	(S)	1 564.8
33219 00	Other gray iron castings, n.s.k. -----	(NA)	(X)	113.5	(NA)	(X)	28.4
33210 --	Gray and ductile iron foundries, n.s.k. -----	(NA)	(X)	417.8	(NA)	(X)	206.6
33210 00	Gray and ductile iron foundries, n.s.k., typically for establishments with 20 employees or more (see note) -----	(NA)	(X)	304.2	(NA)	(X)	160.5
33210 02	Gray and ductile iron foundries, n.s.k., typically for establishments with less than 20 employees (see note) -----	(NA)	(X)	113.6	(NA)	(X)	46.1
3322- --	MALLEABLE IRON FOUNDRIES						
	Total -----	(NA)	(X)	343.1	(NA)	(X)	7370.8
33221 --	Standard malleable iron castings: -----						
33221 00	Standard malleable iron castings ----- 1,000 s tons..	27	*142.1	175.9	38	115.5	208.0
33222 --	Pearlitic malleable iron castings: -----						
33222 00	Pearlitic malleable iron castings ----- 1,000 s tons..	10	116.4	162.2	16	99.7	150.6
33220 --	Malleable iron foundries, n.s.k. -----	(NA)	(X)	5.0	(NA)	(X)	12.2
33220 00	Malleable iron foundries, n.s.k., typically for establishments with 20 employees or more (see note) -----	(NA)	(X)	2.0	(NA)	(X)	9.5
33220 02	Malleable iron foundries, n.s.k., typically for establishments with less than 20 employees (see note) -----	(NA)	(X)	3.0	(NA)	(X)	2.7
3324- --	STEEL INVESTMENT FOUNDRIES						
	Total -----	(NA)	(X)	1 322.8	(NA)	(X)	963.6
33240 --	Steel investment castings: -----						
33240 63	Carbon, including low alloy ----- 1,000 lb..	30	(S)	72.6	48	(S)	139.5
33240 64	Alloy, excluding stainless ----- do..	27	(S)	57.5	46	(S)	233.2
33240 66	Stainless steel ----- do..	54	(S)	171.3	59	(S)	198.4
33240 67	Hi-temp metal castings (iron, nickel, or cobalt-base alloys) ----- do..	21	41 165.0	897.5	31	22 971.7	354.2
33240 00	Steel investment foundries, n.s.k., typically for establishments with 10 employees or more (see note) -----	(NA)	(X)	101.4	(NA)	(X)	34.5
33240 02	Steel investment foundries, n.s.k., typically for establishments with less than 10 employees (see note) -----	(NA)	(X)	22.5	(NA)	(X)	3.9
3325- --	STEEL FOUNDRIES, N.E.C.						
	Total -----	(NA)	(X)	1 608.3	(NA)	(X)	2 009.7
33252 --	Carbon steel castings, except investment -----	(NA)	(X)	708.4	(NA)	(X)	982.0
33252 11	Cast steel railroad car wheels and railway specialties ----- 1,000 tons..	9	(S)	222.7	14	275.9	*199.4
33252 15	Rolls for rolling mills ----- do..	4	(D)	(D)	9	(S)	21.2
33252 19	Other carbon steel castings ----- do..	88	187.7	410.4	126	*292.6	753.2
33252 00	Carbon steel castings, except investment, n.s.k. -----	(NA)	(X)	35.3	(NA)	(X)	8.3
33254 --	High alloy steel castings, except investment -----	(NA)	(X)	365.1	(NA)	(X)	496.0
33254 21	High manganese steel castings ----- 1,000 s tons..	17	40.4	71.9	14	**44.8	95.3
33254 31	Other high alloy steel castings ----- do..	68	(S)	272.8	100	**57.8	393.9
33254 00	High alloy steel castings, except investment, n.s.k. -----	(NA)	(X)	20.3	(NA)	(X)	6.9
33255 --	Other alloy steel castings, except investment -----	(NA)	(X)	360.1	(NA)	(X)	465.1
33255 51	Railway specialties ----- 1,000 s tons..	6	(D)	(D)	4	13.1	22.0
33255 55	Rolls for rolling mills ----- do..	6	(S)	53.8	8	**28.4	51.2
33255 59	All other alloy steel castings ----- do..	53	*168.8	259.1	80	(S)	382.5
33255 00	Other alloy steel castings, except investments, n.s.k. ----- do..	(NA)	(X)	39.6	(NA)	(X)	9.5
33250 --	Steel foundries, n.e.c., n.s.k. -----	(NA)	(X)	174.8	(NA)	(X)	66.5
33250 00	Steel foundries, n.e.c., n.s.k., typically for establishments with 20 employees or more (see note) -----	(NA)	(X)	104.5	(NA)	(X)	45.1
33250 02	Steel foundries, n.e.c., n.s.k., typically for establishments with less than 20 employees (see note) -----	(NA)	(X)	70.3	(NA)	(X)	21.4

See footnotes at end of table.

**Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers:
1987 and 1982—Con.**

[Includes quantity and value of products of this industry produced by (1) establishments classified in this industry (primary) and (2) establishments classified in other industries (secondary). Transfers of products of this industry from one establishment of a company to another establishment of the same company (interplant transfers) are also included. For further explanation, see Value of Shipments in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 product code	Product	1987			1982		
		Number of companies with shipments of \$100,000 or more	Product shipments ¹		Number of companies with shipments of \$100,000 or more	Product shipments ¹	
			Quantity ²	Value (million dollars)		Quantity ²	Value (million dollars)
3363- --	ALUMINUM DIE-CASTINGS⁹						
	Total	(NA)	(X)	2 309.2	(NA)	(X)	(NA)
33630 --	Aluminum and aluminum-base alloy die-castings:						
33630 00	Aluminum and aluminum-base alloy die-castings (except cast aluminum cooking utensils)	(NA)	(S)	2 283.3	(NA)	(NA)	(NA)
33630 02	Aluminum die-castings, n.s.k., typically for establishments with less than 10 employees (see note)	(NA)	(X)	25.9	(NA)	(X)	(NA)
3364- --	NONFERROUS DIE-CASTINGS, EXCEPT ALUMINUM¹⁰						
	Total	(NA)	(X)	1 005.3	(NA)	(X)	(NA)
33640 --	Nonferrous die-castings, except aluminum:						
33640 11	Copper and copper-base alloys (including bearings and bushings)	16	(S)	29.0	10	(S)	12.8
33640 21	Zinc and zinc-base alloy die-castings	164	*301.0	645.0	194	*303.5	534.2
33640 31	Magnesium and magnesium-base alloy die-castings	10	12.1	43.4	10	5.5	17.1
33640 41	Lead and lead-base alloy die-castings	8	*30.6	29.5	14	(S)	19.0
33640 51	Other nonferrous metal die-castings	5	(S)	7.5	17	*11.7	67.5
33640 00	Nonferrous die-castings, except aluminum, n.s.k., typically for establishments with 10 employees or more (see note)	(NA)	(X)	230.4	(NA)	(X)	(NA)
33640 02	Nonferrous die-castings, except aluminum n.e.c., n.s.k., typically for establishments with less than 10 employees (see note)	(NA)	(X)	20.5	(NA)	(X)	(NA)
3365- --	ALUMINUM FOUNDRIES (CASTINGS, EXCEPT DIE)¹¹						
	Total	(NA)	(X)	1 746.5	(NA)	(X)	(NA)
33650 --	Aluminum and aluminum-base castings, except die (including cast finished products):						
33650 11	Sand	(NA)	**226.6	682.4	383	196.1	569.8
33650 31	Permanent and semipermanent mold	110	472.1	647.9	115	*259.2	434.0
33650 51	Investment	33	(S)	103.1	37	(S)	73.7
33650 61	Other	43	(S)	71.8	35	(S)	105.1
33650 73	Nonelectric cast aluminum pressure cookers, household type, and nonelectric cast aluminum cooking utensils	6	(X)	37.8	5	(X)	29.0
33650 00	Aluminum foundries (castings, except die), n.s.k., typically for establishments with 10 employees or more (see note)	(NA)	(X)	140.5	(NA)	(X)	(NA)
33650 02	Aluminum foundries (castings, except die), n.s.k., typically for establishments with less than 10 employees (see note)	(NA)	(X)	63.0	(NA)	(X)	(NA)
3366- --	COPPER FOUNDRIES (CASTINGS, EXCEPT DIE)¹²						
	Total	(NA)	(X)	684.8	(NA)	(X)	701.9
33660 --	Copper and copper-base alloy castings, except die:						
	Copper and copper-base alloy castings:						
	Sand castings:						
33660 20	Alloy	46	(S)	54.5	58	*38.4	82.3
33660 21	Other leaded and semi-lead bronzes	77	(S)	93.0	113	(S)	80.0
33660 22	Tin bronzes, including leaded and high leaded	35	(S)	31.5	59	*46.8	55.0
33660 23	Other alloys, including yellow and leaded yellow bronzes, nickel tin bronzes, nickel silvers, lead bronzes, and special alloys	43	(S)	38.3	49	**104.5	72.3
33660 24	Copper and high copper alloys	22	(S)	39.7	42	20.8	72.3
33660 25	Engineered alloys, including manganese bronzes, silicon bronzes and bronzes, aluminum bronzes, and copper nickels	63	(S)	60.1	101	*65.8	102.5
33660 31	Permanent and semipermanent mold	8	(S)	21.8	11	(S)	33.2
33660 51	Investment	15	(S)	20.6	17	(S)	9.8
33660 61	Centrifugal	7	8.0	21.6			
33660 61	Other	13	*9.4	19.4	24	**50.6	52.1
33660 72	Copper-base alloy bearings and bushings, nonmachined	9	(X)	13.3	13	(X)	13.7
33660 00	Copper foundries (castings, except die), n.s.k., typically for establishments with 10 employees or more (see note)	(NA)	(X)	224.8	(NA)	(X)	(NA)
33660 02	Copper foundries (castings, except die), n.s.k., typically for establishments with less than 10 employees (see note)	(NA)	(X)	46.0	(NA)	(X)	(NA)
3369- --	NONFERROUS FOUNDRIES (CASTINGS, EXCEPT DIE), N.E.C.¹³						
	Total	(NA)	(X)	374.2	(NA)	(NA)	(NA)
33690 --	Nonferrous castings, except die:						
33690 11	Zinc castings, except die	8	(S)	14.3	13	(S)	15.1
33690 15	Magnesium and magnesium-base alloy, except die-castings:						
33690 21	Sand	19	(S)	63.1	22	(S)	67.4
33690 21	Cast anodes						
33690 25	Other, including permanent and semipermanent molds	5	(S)	18.1	(NA)	(X)	(NA)
33690 91	Titanium, except die-castings						
33690 98	Other nonferrous metal castings, excluding die-castings	20	(S)	249.3	37	(S)	168.9
33690 00	Nonferrous foundries (castings, except die), n.s.k., typically for establishments with 20 employees or more (see note)	(NA)	(X)	21.9	(NA)	(X)	(NA)
33690 02	Nonferrous foundries (castings, except die), n.e.c., n.s.k., typically for establishments with less than 10 employees (see note)	(NA)	(X)	7.5	(NA)	(X)	(NA)

See footnotes at end of table.

Table 2. Product and Product Classes—Quantity and Value of Shipments by All Producers: 1987 and 1982—Con.

Note: In 1987 Census of Manufactures, data for establishments of small single unit companies with up to 20 employees were estimated from administrative-record data rather than data actually collected from respondents. Employment cutoffs used for administrative records for each industry and shipments figures are included in code ending with "002". In both 1987 and 1982 Censuses of Manufactures, products not completely identified on standard forms were coded in appropriate product class (five-digit) followed by "00" or to appropriate product group code (four-digit) followed by "000".

¹Data reported by all producers, not just those with shipments of \$100,000 or more.

²For some establishments, data have been estimated from central unit values which are based on quantity-value relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

³In 1982, data for these products were published as codes 33211 22, 33211 24, 33211 27, and 3321 30.

⁴In 1982, data for these products were published as codes 33211 33, 33211 36, 33211 39, and 33211 42.

⁵In 1982, data for these products were published as codes 33217 32, 33217 34, 33217 37, and 33217 40.

⁶In 1982, data for these products were published as codes 33217 43, 33217 46, 33217 49, and 33217 52.

⁷Additional tonnage data are published in the Current Industrial Report M33A, Iron and Steel Castings. Data differ from census data because CIR production data "for own use" include interplant transfers and castings produced and consumed by plants with captive foundries.

⁸In 1982, data for this product were published as codes 33252 12 and 33252 13.

⁹Industry 3363 is new for 1987. In 1982, data for this industry were published as part of 3361.

¹⁰Industry 3364 is new for 1987. In 1982, data for this industry were published as part of 3362 and part of 3369.

¹¹Industry 3365 is new for 1987. In 1982, data for this industry were published as part of 3361.

¹²Industry 3366 is new for 1987. In 1982, data for this industry were published as part of 3362.

¹³Industry 3369 is revised for 1987. In 1982, data for this industry were published as part of 3369.

Table 3. Materials Consumed by Kind: 1987 and 1982

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
	INDUSTRY 3321, GRAY AND DUCTILE IRON FOUNDRIES				
	Materials, parts, containers, and supplies	(X)	2 286.7	(X)	2 082.8
331051	Pig iron (excluding silvery iron)	625.8	100.9	662.8	148.9
	Nonferrous metals, alloys, and ferroalloys (ingot, pig, shot, etc.):				
333404	Aluminum, unalloyed	1.9	2.8	*.4	.6
333405	Aluminum-base alloy			2.9	4.2
333121	Copper, unalloyed (cathodes, ingot, cakes, slabs, etc.) .....	.6	.9	*1.1	1.7
334123	Copper-base alloy raw materials (ingot, billets, shot, waffle, hardeners, etc.)	5.8	7.5	*5.4	9.2
333348	Zinc and zinc-base alloy				
333971	Nickel-base alloy	(S)	7.2	(S)	13.1
333982	Cobalt-base alloy				
333973	Magnesium and magnesium-base alloy	*18.5	18.0	(S)	21.1
331320	Ferrochromium	*12.7	7.6	**8.1	5.4
331313	Ferromanganese, silicomanganese, and manganese	*54.3	23.2	*42.1	15.5
331331	Ferrosilicon (more than 8 percent silicon)	199.6	85.9	140.6	66.4
331309	Other ferroalloys (including silvery iron)	**97.9	57.1	**110.1	48.3
190023	Iron and steel purchased scrap (excluding home scrap)	6 882.8	609.9	5 292.7	432.6
144603	Sand	(S)	95.9	(S)	81.3
325501	Clay refractories	(S)	16.8	(S)	23.4
329701	Nonclay refractories	(S)	19.1	(S)	19.0
354402	Industrial dies, molds, jigs, and fixtures	(X)	5.9	(X)	10.2
329101	Grinding wheels and other abrasive products (except industrial diamonds)	(X)	20.8	(X)	17.6
354301	Industrial patterns	(X)	18.3	(X)	25.6
362002	Electrodes	(X)	12.1	(X)	12.1
289953	Pattern wax	(X)	(²)	(X)	(²)
970099	All other materials and components, parts, containers, and supplies (excluding coal and coke)	(X)	3952.8	(X)	3901.7
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	224.0	(X)	224.9
	INDUSTRY 3322, MALLEABLE IRON FOUNDRIES				
	Materials, parts, containers, and supplies	(X)	66.2	(X)	66.2
331051	Pig iron (excluding silvery iron)	(S)	.9	15.2	3.0
	Nonferrous metals, alloys, and ferroalloys (ingot, pig, shot, etc.):				
333404	Aluminum, unalloyed				
333405	Aluminum-base alloy	(S)	.4	.8	1.6
333121	Copper, unalloyed (cathodes, ingot, cakes, slabs, etc.)				
334123	Copper-base alloy raw materials (ingot, billets, shot, waffle, hardeners, etc.)				
333348	Zinc and zinc-base alloy				
333973	Magnesium and magnesium-base alloy	(D)	(⁴)		
333971	Nickel-base alloy	(D)	(⁴)	.1	.3
331313	Ferromanganese, silicomanganese, and manganese				
331320	Ferrochromium	5.3	2.1	6.5	2.8
331331	Ferrosilicon (more than 8 percent silicon)				
331309	Other ferroalloys (including silvery iron)	1.7	1.0	2.2	1.3
190023	Iron and steel purchased scrap (excluding home scrap)	171.2	18.4	204.2	16.8
144603	Sand	**63.2	1.7	*109.3	2.2
325501	Clay refractories	*3.5	.9	**6.8	1.4
329701	Nonclay refractories	(S)	.7	(S)	.8
354402	Industrial dies, molds, jigs, and fixtures	(X)	.1	(X)	(⁵)
329101	Grinding wheels and other abrasive products (except industrial diamonds)	(X)	.6	(X)	1.1
354301	Industrial patterns	(X)	.3	(X)	.1
362002	Electrodes	(X)	-	(X)	(⁵)
289953	Pattern wax	(X)	-	(X)	(⁵)
970099	All other materials and components, parts, containers, and supplies (excluding coal and coke)	(X)	434.9	(X)	25.2
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	4.2	(X)	8.7

See footnotes at end of table.

Table 3. Materials Consumed by Kind: 1987 and 1982—Con.

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
INDUSTRY 3324, STEEL INVESTMENT FOUNDRIES					
	Materials, parts, containers, and supplies -----	(X)	380.5	(X)	282.4
331051	Pig iron (excluding silvery iron) ----- 1,000 s tons--	(D)	(⁶)	(S)	1.6
	Nonferrous metals, alloys, and ferroalloys (ingot, pig, shot, etc.): -----				
333404	Aluminum, unalloyed ----- 1,000 s tons--	(Z)	(⁶)	(Z)	(⁷)
333405	Aluminum-base alloy ----- do--	(S)	1.9	(S)	(⁷)
333121	Copper, unalloyed (cathodes, ingot, cakes, slabs, etc.) ----- do--	(Z)	(Z)	(Z)	(Z)
334123	Copper-base alloy raw materials (ingot, billets, shot, waffle, hardeners, etc.) ----- do--	(S)	4.4	.6	1.1
333973	Magnesium and magnesium-base alloy ----- do--	(D)	(⁶)	(S)	(⁷)
333971	Nickel-base alloy ----- do--	14.6	98.7	7.3	49.3
333982	Cobalt-base alloy ----- 1,000 lb--	(S)	20.1	4.7	27.9
331320	Ferrochromium ----- 1,000 s tons--	(S)	1.5	2.9	2.5
331313	Ferromanganese, silicomanganese, and manganese ----- do--	(D)	(⁶)	(S)	.4
331331	Ferrosilicon (more than 8 percent silicon) ----- do--	(S)	1.0	1.1	.4
331309	Other ferroalloys (including silvery iron) ----- do--	(S)	14.5	11.7	16.5
190023	Iron and steel purchased scrap (excluding home scrap) ----- do--	(S)	10.9	74.3	7.6
144603	Sand ----- do--	(S)	10.6	*70.1	10.1
325501	Clay refractories ----- do--	(S)	3.7	*23.0	2.3
329701	Nonclay refractories ----- do--	(S)	4.3	(S)	6.9
354402	Industrial dies, molds, jigs, and fixtures ----- do--	(X)	9.4	(X)	9.4
329101	Grinding wheels and other abrasive products (except industrial diamonds) ----- do--	(X)	16.2	(X)	8.3
354301	Industrial patterns ----- do--	(X)	(⁶)	(X)	2.2
362002	Electrodes ----- do--	(X)	1.2	(X)	1.2
289953	Pattern wax ----- do--	(X)	7.4	(X)	7.9
970099	All other materials and components, parts, containers, and supplies (excluding coal and coke) ----- do--	(X)	*139.0	(X)	784.1
971000	Materials, parts, containers, and supplies, n.s.k. ² ----- do--	(X)	35.7	(X)	42.7
INDUSTRY 3325, STEEL FOUNDRIES, N.E.C.					
	Materials, parts, containers, and supplies -----	(X)	497.4	(X)	607.7
331051	Pig iron (excluding silvery iron) ----- 1,000 s tons--	14.4	2.8	(S)	10.7
	Nonferrous metals, alloys, and ferroalloys (ingot, pig, shot, etc.): -----				
333404	Aluminum, unalloyed ----- 1,000 s tons--	(S)	5.7	*1.1	1.3
333405	Aluminum-base alloy ----- do--	(S)	.5	(S)	1.0
333121	Copper, unalloyed (cathodes, ingot, cakes, slabs, etc.) ----- do--	1.7	2.6	**2.5	2.9
334123	Copper-base alloy raw materials (ingot, billets, shot, waffle, hardeners, etc.) ----- do--	1.6	2.1	*2.0	3.2
333348	Zinc and zinc-base alloy ----- do--	(D)	(⁶)	(NA)	(NA)
333973	Magnesium and magnesium-base alloy ----- do--	(S)	.3	(D)	(⁶)
333971	Nickel-base alloy ----- do--	4.2	17.8	(S)	21.6
333982	Cobalt-base alloy ----- 1,000 lb--	**68.4	.4	*461.5	2.4
331320	Ferrochromium ----- 1,000 s tons--	*20.1	15.1	**12.6	11.9
331313	Ferromanganese, silicomanganese, and manganese ----- do--	*14.4	6.2	*17.1	8.9
331331	Ferrosilicon (more than 8 percent silicon) ----- do--	7.5	3.9	**7.7	4.8
331309	Other ferroalloys (including silvery iron) ----- do--	(S)	8.9	(S)	14.2
190023	Iron and steel purchased scrap (excluding home scrap) ----- do--	*679.7	68.9	*995.7	93.7
144603	Sand ----- do--	(S)	19.7	(S)	28.0
325501	Clay refractories ----- do--	(S)	5.0	(S)	6.2
329701	Nonclay refractories ----- do--	(S)	5.7	(S)	9.8
354402	Industrial dies, molds, jigs, and fixtures ----- do--	(X)	2.1	(X)	6.1
329101	Grinding wheels and other abrasive products (except industrial diamonds) ----- do--	(X)	8.7	(X)	12.7
354301	Industrial patterns ----- do--	(X)	3.5	(X)	7.6
362002	Electrodes ----- do--	(X)	11.4	(X)	24.0
289953	Pattern wax ----- do--	(X)	(⁶)	(X)	(⁶)
970099	All other materials and components, parts, containers, and supplies (excluding coal and coke) ----- do--	(X)	*177.5	(X)	*232.9
971000	Materials, parts, containers, and supplies, n.s.k. ² ----- do--	(X)	128.6	(X)	103.8
INDUSTRY 3363, ALUMINUM DIE-CASTINGS ¹⁰					
	Materials, parts, containers, and supplies -----	(X)	1 008.6	(NA)	(NA)
331051	Pig iron (excluding silvery iron) ----- 1,000 s tons--	-	-	(NA)	(NA)
	Nonferrous metals, alloys, and ferroalloys (ingot, pig, shot, etc.): -----				
333404	Aluminum, unalloyed ----- 1,000 s tons--	14.1	24.6	(NA)	(NA)
333405	Aluminum-base alloy ----- do--	(S)	494.9	(NA)	(NA)
333121	Copper, unalloyed (cathodes, ingot, cakes, slabs, etc.) ----- do--	(D)	(D)	(NA)	(NA)
334123	Copper-base alloy raw materials (ingot, billets, shot, waffle, hardeners, etc.) ----- do--	**2.5	2.8	(NA)	(NA)
333348	Zinc and zinc-base alloy ----- do--	**32.3	22.8	(NA)	(NA)
333973	Magnesium and magnesium-base alloy ----- do--	(D)	(D)	(NA)	(NA)
333971	Lead-base alloy ----- do--	-	-	(NA)	(NA)
331308	Ferroalloys (including ferrochromium, ferromanganese, ferrosilicon, manganese, silvery iron, etc.) ----- do--	(D)	(D)	(NA)	(NA)
190023	Scrap (excluding home scrap): Iron and steel purchased scrap ----- 1,000 s tons--	-	-	(NA)	(NA)
190020	Nonferrous metal scrap: Aluminum and aluminum-base alloy ----- 1,000 s tons--	(D)	(D)	(NA)	(NA)
190024	Copper and copper-base alloy scrap ----- do--	(Z)	(Z)	(NA)	(NA)
144603	Sand ----- do--	(S)	.2	(NA)	(NA)
354402	Industrial dies, molds, jigs, and fixtures ----- do--	(X)	16.9	(NA)	(NA)
329101	Grinding wheels and other abrasive products, except industrial diamonds ----- do--	(X)	3.0	(NA)	(NA)
354301	Industrial patterns ----- do--	(X)	(D)	(NA)	(NA)
970099	All other materials and components, parts, containers, and supplies ----- do--	(X)	182.3	(NA)	(NA)
971000	Materials, parts, containers, and supplies, n.s.k. ² ----- do--	(X)	168.7	(NA)	(NA)

See footnotes at end of table.

Table 3. Materials Consumed by Kind: 1987 and 1982—Con.

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
	INDUSTRY 3364, NONFERROUS DIE-CASTINGS, EXCEPT ALUMINUM¹⁰				
	Materials, parts, containers, and supplies	(X)	338.7	(NA)	(NA)
331051	Pig iron (excluding silvery iron) 1,000 s tons..	-	-	(NA)	(NA)
	Nonferrous metals, alloys, and ferroalloys (ingot, pig, shot, etc.):				
333404	Aluminum, unalloyed 1,000 s tons..	(D)	(D)	(NA)	(NA)
333405	Aluminum-base alloy do..	20.4	24.1	(NA)	(NA)
333121	Copper, unalloyed (cathodes, ingot, cakes, slabs, etc.)	(D)	(D)	(NA)	(NA)
334123	Copper-base alloy raw materials (ingot, billets, shot, waffle, hardeners, etc.) do..	**2.8	5.8	(NA)	(NA)
333348	Zinc and zinc-base alloy do..	*115.5	104.8	(NA)	(NA)
333973	Magnesium and magnesium-base alloy do..	6.0	13.5	(NA)	(NA)
333971	Lead-base alloy do..	11.4	11.6	(NA)	(NA)
333982	Cobalt-base alloy do..	(D)	(D)	(NA)	(NA)
331308	Ferroalloys (including ferrochromium, ferromanganese, ferrosilicon, manganese, silvery iron, etc.) do..	-	-	(NA)	(NA)
190023	Scrap (excluding home scrap): Iron and steel purchased scrap 1,000 s tons..	-	-	(NA)	(NA)
190020	Nonferrous metal scrap: Aluminum and aluminum-base alloy 1,000 s tons..	-	-	(NA)	(NA)
190024	Copper and copper-base alloy scrap (purchased scrap only) do..	-	-	(NA)	(NA)
144603	Sand do..	(S)	.5	(NA)	(NA)
354402	Industrial dies, molds, jigs, and fixtures do..	(X)	4.9	(NA)	(NA)
329101	Grinding wheels and other abrasive products, except industrial diamonds do..	(X)	(D)	(NA)	(NA)
354301	Industrial patterns do..	(X)	.2	(NA)	(NA)
970099	All other materials and components, parts, containers, and supplies do..	(X)	77.7	(NA)	(NA)
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	90.1	(NA)	(NA)
	INDUSTRY 3365, ALUMINUM FOUNDRIES¹⁰				
	Materials, parts, containers, and supplies	(X)	660.0	(NA)	(NA)
331051	Pig iron (excluding silvery iron) 1,000 s tons..	.6	.1	(NA)	(NA)
	Nonferrous metals, alloys, and ferroalloys (ingot, pig, shot, etc.):				
333404	Aluminum, unalloyed 1,000 s tons..	40.1	43.3	(NA)	(NA)
333405	Aluminum-base alloy do..	259.8	271.3	(NA)	(NA)
333121	Copper, unalloyed (cathodes, ingot, cakes, slabs, etc.)	(S)	2.0	(NA)	(NA)
334123	Copper-base alloy raw materials (ingot, billets, shot, waffle, hardeners, etc.) do..	4.7	6.4	(NA)	(NA)
333348	Zinc and zinc-base alloy do..	5.2	4.7	(NA)	(NA)
333973	Magnesium and magnesium-base alloy do..	(S)	5.0	(NA)	(NA)
333971	Lead-base alloy do..	(S)	.1	(NA)	(NA)
331308	Ferroalloys (including ferrochromium, ferromanganese, ferrosilicon, manganese, silvery iron, etc.) do..	(D)	(D)	(NA)	(NA)
190023	Scrap (excluding home scrap): Iron and steel purchased scrap 1,000 s tons..	(D)	(D)	(NA)	(NA)
190020	Nonferrous metal scrap: Aluminum and aluminum-base alloy 1,000 s tons..	(D)	(D)	(NA)	(NA)
190024	Copper and copper-base alloy scrap do..	(D)	(D)	(NA)	(NA)
144603	Sand do..	(S)	15.2	(NA)	(NA)
354402	Industrial dies, molds, jigs, and fixtures do..	(X)	10.6	(NA)	(NA)
329101	Grinding wheels and other abrasive products, except industrial diamonds do..	(X)	4.9	(NA)	(NA)
354301	Industrial patterns do..	(X)	6.7	(NA)	(NA)
970099	All other materials and components, parts, containers, and supplies do..	(X)	127.5	(NA)	(NA)
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	145.0	(NA)	(NA)
	INDUSTRY 3366, COPPER FOUNDRIES¹⁰				
	Materials, parts, containers, and supplies	(X)	247.1	(NA)	(NA)
331051	Pig iron (excluding silvery iron) 1,000 s tons..	(D)	(D)	(NA)	(NA)
	Nonferrous metals, alloys, and ferroalloys (ingot, pig, shot, etc.):				
333404	Aluminum, unalloyed 1,000 s tons..	(S)	.3	(NA)	(NA)
333405	Aluminum-base alloy do..	**4.7	6.4	(NA)	(NA)
333121	Copper, unalloyed (cathodes, ingot, cakes, slabs, etc.)	(S)	5.5	(NA)	(NA)
334123	Copper-base alloy raw materials (ingot, billets, shot, waffle, hardeners, etc.) do..	46.4	63.4	(NA)	(NA)
333348	Zinc and zinc-base alloy do..	(D)	(D)	(NA)	(NA)
333973	Magnesium and magnesium-base alloy do..	(S)	.3	(NA)	(NA)
333971	Lead-base alloy do..	(D)	(D)	(NA)	(NA)
331308	Ferroalloys (including ferrochromium, ferromanganese, ferrosilicon, manganese, silvery iron, etc.) do..	(D)	(D)	(NA)	(NA)
190023	Scrap (excluding home scrap): Iron and steel purchased scrap 1,000 s tons..	(S)	1.2	(NA)	(NA)
190020	Nonferrous metal scrap: Aluminum and aluminum-base alloy 1,000 s tons..	(D)	(D)	(NA)	(NA)
190024	Copper and copper-base alloy scrap do..	(S)	6.4	(NA)	(NA)
144603	Sand do..	(S)	2.8	(NA)	(NA)
354402	Industrial dies, molds, jigs, and fixtures do..	(X)	.4	(NA)	(NA)
329101	Grinding wheels and other abrasive products, except industrial diamonds do..	(X)	1.5	(NA)	(NA)
354301	Industrial patterns do..	(X)	1.9	(NA)	(NA)
970099	All other materials and components, parts, containers, and supplies do..	(X)	22.8	(NA)	(NA)
971000	Materials, parts, containers, and supplies, n.s.k. ²	(X)	130.4	(NA)	(NA)

See footnotes at end of table.

Table 3. Materials Consumed by Kind: 1987 and 1982—Con.

[Includes quantity and cost of materials consumed or put into production by establishments classified only in this industry. For further explanation, see Cost of Materials in appendix. For meaning of abbreviations and symbols, see introductory text]

1987 material code	Material	1987		1982	
		Quantity ¹	Delivered cost (million dollars)	Quantity ¹	Delivered cost (million dollars)
	INDUSTRY 3369, NONFERROUS FOUNDRIES, N.E.C.¹⁰				
	Materials, parts, containers, and supplies -----	(X)	99.1	(NA)	(NA)
	Nonferrous metals, alloys, and ferroalloys (ingot, pig, shot, etc.):				
333404	Aluminum, unalloyed ----- 1,000 s tons..	-	-	(NA)	(NA)
333405	Aluminum-base alloy ----- do..	*.5	.9	(NA)	(NA)
333121	Copper, unalloyed (cathodes, ingot, cakes, slabs, etc.) ----- do..	(D)	(D)	(NA)	(NA)
334123	Copper-base alloy raw materials (ingot, billets, shot, waffle, hardeners, etc.) ----- do..	(D)	(D)	(NA)	(NA)
333348	Zinc and zinc-base alloy ----- do..	(S)	.9	(NA)	(NA)
333973	Magnesium and magnesium-base alloy ----- do..	(S)	2.8	(NA)	(NA)
333971	Lead-base alloy ----- do..	(D)	(D)	(NA)	(NA)
333982	Cobalt-base alloy ----- do..	(D)	(D)	(NA)	(NA)
331308	Ferroalloys (including ferrochromium, ferromanganese, ferrosilicon, manganese, silvery iron, etc.) ----- do..	(D)	(D)	(NA)	(NA)
	Scrap (excluding home scrap):				
	Nonferrous metal scrap:				
190020	Aluminum and aluminum-base alloy ----- 1,000 s tons..	(D)	(D)	(NA)	(NA)
144603	Sand ----- do..	(S)	6.2	(NA)	(NA)
354402	Industrial dies, molds, jigs, and fixtures -----	(X)	(D)	(NA)	(NA)
329101	Grinding wheels and other abrasive products (except industrial diamonds) -----	(X)	2.6	(NA)	(NA)
354301	Industrial patterns -----	(X)	(D)	(NA)	(NA)
970099	All other materials and components, parts, containers, and supplies -----	(X)	60.2	(NA)	(NA)
971000	Materials, parts, containers, and supplies, n.s.k. ² -----	(X)	18.1	(NA)	(NA)

¹For some establishments, data have been estimated from central unit values which are based on quantity-cost relationships of reported data. The following symbols are used when percentage of each quantity figure estimated in this manner equals or exceeds 10 percent of published figure: * 10 to 19 percent estimated; ** 20 to 29 percent estimated. If 30 percent or more is estimated, figure is replaced by (S).

²Total cost of materials of establishments that did not report detailed materials data, including establishments that were not mailed a form.

³For 1987 and 1982, material code 289953 is included with material code 970099.

⁴For 1987, material codes 333973 and 333971 are included with material code 970099 to avoid disclosing data for individual companies.

⁵For 1982, material codes 354402 and 362002 were included with material code 289953.

⁶For 1987, material codes 331051, 333404, 333973, 331313, and 354301 are included with material code 970099.

⁷For 1982, material codes 333404, 333405, and 333973 were included with material code 970099 to avoid disclosing data for individual companies.

⁸For 1987, material codes 333348 and 289953 are included with material code 970099 to avoid disclosing data for individual companies.

⁹For 1982, material codes 333973 and 289953 were included with material code 970099.

¹⁰Industry definition is new for 1987 Census of Manufactures. An explanation of the Standard Industrial Classification revision will appear in the final industry series report that will supersede this report.

APPENDIX

Scope and Coverage and Explanation of Terms

GENERAL

The 1987 Census of Manufactures is the 32nd census of manufacturing establishments conducted in the United States. For 1987, it was conducted as part of the economic censuses, which included the censuses of mineral industries, construction industries, retail and wholesale trades, service industries, selected transportation activities, and minority-owned and women-owned businesses, under authority of title 13 of the United States Code. Title 13 specifies that an economic census be conducted every 5 years to cover years ending in 2 and 7.

SCOPE AND COVERAGE

Establishment Basis of Reporting

The census of manufactures is conducted on an establishment basis. All manufacturing establishments with one paid employee or more at any time during the year are covered by the census of manufactures. Therefore, a company operating at more than one location is required to file a separate report for each location. This report excludes information for separately operated administrative offices, warehouses, garages, and other auxiliary units which service manufacturing establishments of the same company. Where these auxiliary operations are conducted at the same location as the manufacturing operation, they are usually included in the report for the operating manufacturing establishment.

Use of Administrative Records

From a universe of approximately 350,000 manufacturing establishments in the 1987 Census of Manufactures, approximately 150,000 small single-establishment companies were excused from filing reports. Selection of the small establishment nonmail cases was done on an industry-by-industry basis. A variable cutoff was used to determine those establishments for which administrative records were to be used in place of a census report. The cutoffs were selected so the administrative-record cases would account for approximately 3 percent or less of the value of shipments for the industry. These cutoffs were then adjusted so that all single-establishment companies with less than 5 employees were excluded from the mail canvass, while all establishments with more than 20 employees were included. Where establishments in the 5 to 20 employee size range were included in the mail canvass, an abbreviated census form was frequently used.

For these nonmail establishments, (and a small number of larger establishment whose reports were not received at the time the data were tabulated) data on employment, payroll, and receipts were obtained from administrative records of other government agencies rather than from census forms. The administrative-record information was then used in conjunction with industry averages to estimate the data for these establishments. The value of shipments and cost of materials were not distributed among specific products and materials but were included in the product and material "not specified by kind" (n.s.k.) categories.

EXPLANATION OF TERMS

Number of establishments and companies—A separate report was required for each manufacturing establishment (plant) with one employee or more. An establishment is defined as a single physical location where manufacturing is performed. A company, on the other hand, is defined as a business organization consisting of one establishment or more under common ownership or control.

All employees—Includes all full-time and part-time employees on the payrolls at any time during the year. Included are all persons on paid sick leave, paid holidays, and paid vacations. Officers of corporations are included as employees; proprietors and partners of unincorporated firms are excluded. The "all employees" number is the average number of production workers plus the number of other employees in mid-March. The number of production workers is the average of those for midmonth payroll periods of March, May, August, and November.

Production workers—Includes workers up through the working-supervisor level engaged in fabricating, processing, assembling, inspecting, receiving, packing, warehousing, shipping (but not delivering), maintenance, repair, janitorial, guard services, product development, auxiliary production for plant's own use (e.g., power-plant), recordkeeping, and other closely associated services. Truckdrivers delivering ready-mixed concrete are also included in production workers.

Other employees—Includes nonproduction personnel, including those engaged in the following activities: supervision above working-supervisor level, sales (including driver/salespersons), sales delivery (truckdrivers and helpers), advertising, credit collection, installation and

servicing of own product, clerical and routine office functions, executive, purchasing, finance, legal, personnel (including cafeteria, etc.), professional, and technical employees.

Payroll—Includes the gross earnings for the “employees” defined above, such as salaries, wages, commissions, dismissal pay, bonuses, vacation and sick leave pay, and compensation in kind, prior to such deductions as employees’ Social Security contributions, withholding taxes, group insurance, union dues, and savings bonds. Respondents were told that in reporting they could follow the definition of payrolls used for calculating the Federal withholding tax.

Production-worker hours—Covers hours worked or paid for at the plant, including actual overtime hours (not straight-time equivalent hours). It excludes hours paid for vacations, holidays, or sick leave when the employee was not at the plant.

Cost of materials—Refers to direct charges actually paid or payable for items consumed or put into production during the year, including freight charges and other direct charges incurred by the establishment in acquiring these materials. It includes the cost of materials or fuels consumed, regardless of whether they were purchased by the individual establishment from other companies, transferred to it from other establishments of the same company, or withdrawn from inventory during the year.

The important components of this cost item are (a) all raw materials, semifinished goods, parts, containers, scrap, and supplies put into production or used as operating supplies and for repair and maintenance during the year; (b) electric energy purchased; (c) fuels consumed for heat, power, or generating electricity; (d) work done by others on materials or parts furnished by manufacturing establishments (contract work); and (e) products bought and resold in the same condition.

Specific materials consumed (table 3)—In addition to the total cost of materials which every establishment was required to report, information was also collected for most manufacturing industries on the consumption of major materials used in manufacturing. These inquiries were restricted to those materials which were important parts of the cost of production in a particular industry and for which cost information was available from manufacturers’ records. Establishments consuming less than a specified amount (usually \$10,000) of a specific material were not requested to report consumption of that material separately. Also, the cost of materials for the small establishments for which administrative records were used was estimated as “not specified by kind” (n.s.k.).

Value of shipments and other receipts—Generally refers to received or receivable net selling values, f.o.b. plant (exclusive of freight and taxes), of all products shipped, both primary and secondary, as well as all

miscellaneous receipts such as receipts for contract work performed for others, installation and repair receipts, sale of scrap, and sale of products bought and resold without further processing. Included are all items made by or for the establishment from materials owned by it whether sold, transferred to other plants of the same company, or shipped on consignment. The net selling value of products made in one plant on a contract basis from materials owned by another was reported by the plant providing the materials.

In a few industries, the value of production or value of work completed is used instead of value of shipments. These industries are identified in the introduction and are footnoted in table 1.

In the case of multiunit companies, the manufacturer was requested to report the value of products transferred to other establishments of the same company at full economic or commercial value, that is, including not only the direct costs of production but also a reasonable proportion of “all other costs” (including company overhead and profit).

Shipments or production of individual products (table 2)—In the 1987 census, detailed shipment information was collected for approximately 11,000 individual products. These products are identified by a seven-digit code and are grouped into approximately 1,500 classes of products, which in turn are primary to 459 four-digit industries. Data at the five-digit product-class level have been collected each year as part of the annual survey of manufactures. Information at the seven-digit level, collected for many industries in the current industrial reports program, is not included in this table.

Value added by manufacture—This measure of manufacturing activity is derived by subtracting the cost of materials, supplies, containers, fuel, purchased electricity, and contract work from the value of shipments for products manufactured plus receipts for services rendered. The result of this calculation is then adjusted by the addition of value added by merchandising operations (that is, the difference between the sales value and cost of merchandise sold without further manufacturing, processing, or assembly) plus the net change in finished goods and work-in-process inventories between the beginning and end of the year.

For those industries where value of production is collected instead of value of shipments (see footnote in table 1), value added is adjusted only for the change in work-in-process inventories between the beginning and end of the year. For those industries where value of work done is collected, the value added does not include an adjustment for the change in finished goods or work-in-process inventories.

Value added avoids the duplication in the figure for value of shipments which results from the use of products of some establishments as materials by others. Value

added is considered to be the best value measure available for comparing the relative economic importance of manufacturing among industries and geographic areas.

Expenditures for new plant and equipment—Establishments in operation and any known plants under construction were asked to report their expenditures for (a) permanent additions and major alterations to manufacturing establishments and (b) new machinery and equipment used for replacement and additions to plant capacity if they are of the type for which depreciation accounts are ordinarily maintained.

These totals exclude expenditures for used plant and equipment, expenditures for land, and cost of maintenance and repairs charged as current operating expenses. Data for used plant and equipment will be published in the final industry bulletin.

End-of-year inventories—Comprised of (a) finished products; (b) work-in-process; and (c) materials, supplies, fuels, etc. Beginning in 1982, respondents were asked to report their inventories at (the lower of) cost or market prior to adjustment to LIFO cost. This is a change from prior years in which respondents were permitted to value their inventories using any generally accepted accounting method.

Therefore, 1982 through 1987 data for inventories are not strictly comparable to prior-year data.

Specialization and coverage ratios—An establishment is classified in a particular industry if its shipments of primary products of the industry exceed in value its shipments of the products of any other single industry. An establishments' shipments include those products assigned to an industry (primary products), those considered primary to other industries (secondary products), and receipts for miscellaneous activities (merchandising, contract work, resales, etc.). The following ratios have been developed to measure the relationship of primary product shipments to the data on shipments for the industry shown in table 1 and data on product shipments shown in table 2.

Specialization ratio—Represents the ratio of primary product shipments to total product shipments (primary and secondary, excluding miscellaneous receipts) for the establishments classified in the industry.

Coverage ratio—Represents the ratio of primary products shipped by the establishments classified in the industry to the total shipments of such products that are shipped by all manufacturing establishments, wherever classified.

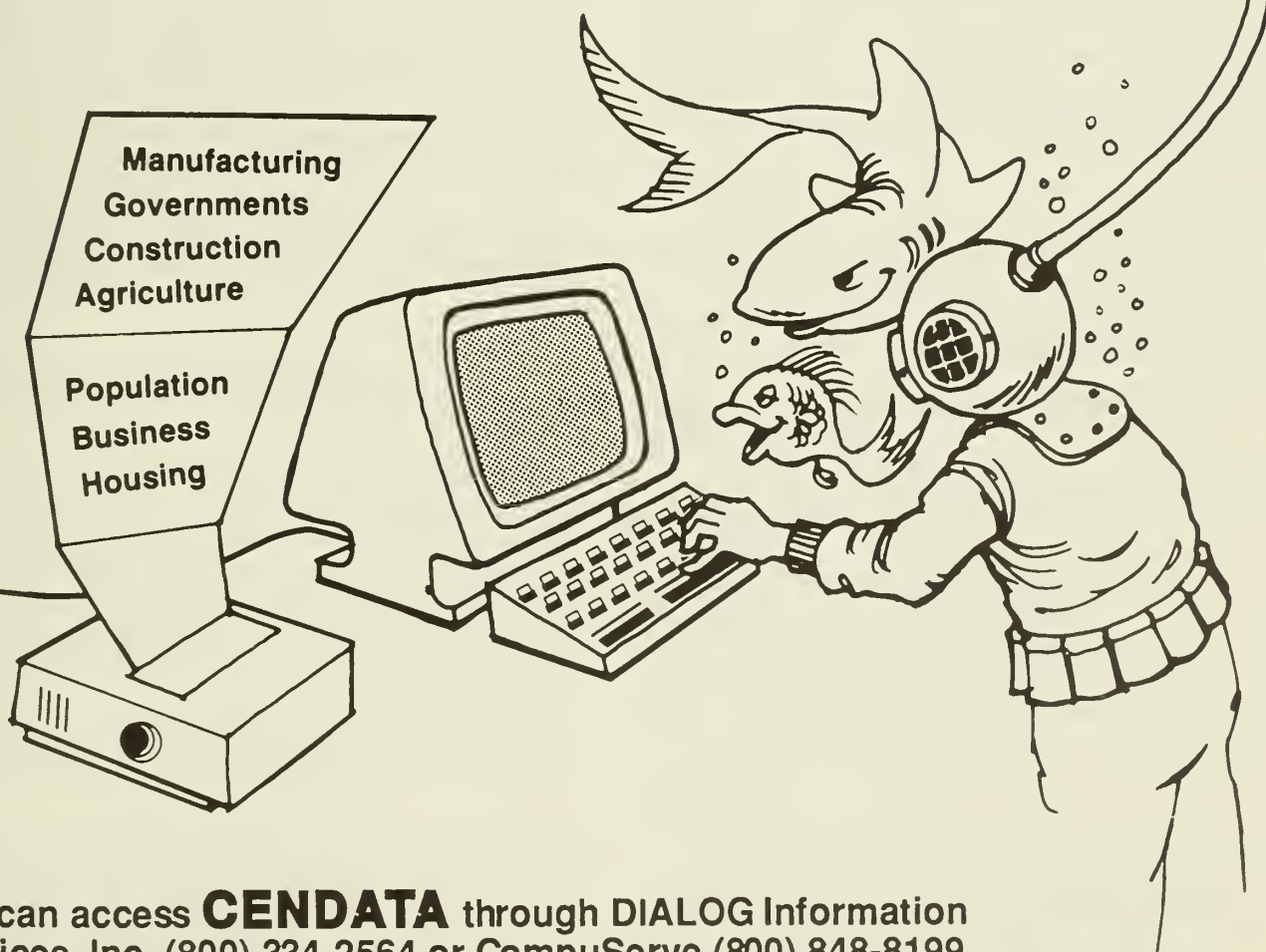


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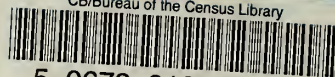
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